

***Blue Ribbon Commission on America's Nuclear Future –
Disposal Subcommittee***

***Panel 1 - What are the essential elements of technically
credible, workable, and publicly acceptable regulations for
disposal (in geologic repositories)?***

September 1, 2010

Dr. Mark T. Peters

Deputy Laboratory Director for Programs

Argonne National Laboratory

Introduction

- **Technical advances and policy changes in site-specific regulations would likely be required attributes in any new repository regulations**
- **Recommend that NRC and EPA review and update the disposal regulations before other repository sites are considered**
- **Regulatory revisions need to address entire fuel cycle and take account of realistic fuel cycle scenarios**



What should be the time frame for protection of public health and safety in disposal regulations?

- **No plausible basis for evaluating behavior of future humans on timescale of one million years**
- **Not reasonable to regulate radiation doses beyond the time where uncertainties become too large to support rational decision-making**
- **Quantitative demonstration of compliance should be limited to a few to several thousands of years**
 - **Precedent in U.S. and international regulations for a 10,000 year limit**
- **Regulations should require a qualitative demonstration of a reasonable expectation that disposal system will continue to function as intended for up to one million years**

How should compliance be demonstrated (including the role of performance assessment)?

- **Performance assessment, including rigorous evaluation of feature, events, and processes, is sound and defensible approach**
 - **Must be strongly underpinned by experiments and process models**
- **Other and multiple lines of evidence should be required to support the safety case**
- **Repository regulations should be performance-based, without specification of rigid criteria for subsystems of repository**
- **Relationship between and relative importance of geologic and engineered barriers must be addressed explicitly and clearly**

Should there be requirements concerning retrievability?

- **Requirements encompass safety and resource recovery**
- **Sound technical and public confidence reasons for maintaining retrievability requirements prior to repository closure**
- **Requirements should be maintained**
 - **Flexible enough to allow for range of disposal concepts**
 - **Should not be a priority over long-term waste isolation**

What can be learned from international experience in developing and implementing HLW disposal regulations?

- **Extensive international experience in assessment and development of disposal regulations**
 - For example, IAEA, NEA, and country-specific efforts
- **Should leverage experience in development of a new set of regulations**
 - Particularly in areas of adaptive management, compliance demonstration, level of protection, and time frame for protection

Are regulatory changes needed to accommodate staged repository development concepts?

- **Current regulatory and statutory structure is consistent with some forms of staging**
- **Would be advantageous for new legislation and regulations to explicitly recognize and facilitate staged development**
- **Important for new generic repository regulations to ensure appropriate interactions with regulator as an important part of staged development process**



Would different regulations be required for disposal systems other than geologic repositories (e.g. deep boreholes)?

- **Flexible set of generic regulations should be developed that are applicable to all disposal media and concepts**
 - **Will facilitate comparisons among alternatives, engender public confidence, and optimize site screening, selection, and licensing**
- **Regulatory framework should be established prior to initiating a future repository development program**

Are there other regulatory issues (e.g. waste classification, dual regulation with RCRA) that should be reconsidered?

- **Revision to the waste classification system needs to be strongly considered to support future fuel cycles**
 - **Needs to occur soon since performance requirements for future repositories and decisions about waste processing, separations, and waste forms depend upon the classification system**
 - **NRC staff working on high-level waste regulations and the LLW classification issue**
 - **DOE is undertaking a major review and revision of their order dealing with its own radioactive waste management activities**
 - **Revised classification system contained in a new Safety Guide issued by the International Atomic Energy Agency**

- **Risk-based approach (rather than source-based) to waste classification would be most appropriate**